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In a letter from Mr. Bond to Mr. Carrington, dated April 4, there occur the following notes and remarks :—

"We obtained a photograph of the comet (Donati's) on September 28th. On October 5th it was visible in the day-time.

"In the list of comets at page 155 of the Annual Report of your Council, the one discovered by Mr. H. P. Tuttle at this observatory on September 5, 1858, has been omitted ;* and on page 142 it should have been stated that the same comet-hunter found Donati's independently on June 28, the day before Parkhurst.

"A nebula, which is to be found neither in Sir J. Herschel's Catalogue nor D'Arrest's, was detected by Mr. Tuttle on the 5th of February in R.A. $3^h\ 21^m$, Decl. + 30° 55′. It follows a star of the 9·10 mag. by 6 seconds, and is 2′ north of it. It is barely visible in a telescope of 3 inches aperture."

After the conclusion of the reading of the papers presented to the Society, the President requested that the Astronomer Royal would occupy the chair for a short time while he offered to the meeting, according to preceding announcement, some remarks on Donati's comet in connexion with the theories that had been devised to account for the physical peculiarities of such bodies, and with especial reference to Bessel's theory of opposite polarities.

He produced diagrams of some of the most celebrated comets, such as those of 1744, 1769, 1811, 1835 (Halley's), and 1858 (Donati's), and showed that the appearances which they exhibited when approaching their perihelion were so similar that generally, in any attempt to form an adequate theory for the phenomena exhibited, any one of them might be taken, but that the excellent drawings and elaborate descriptions of Donati's comet rendered it a much more interesting subject of study than any which preceded it. The phenomena consist chiefly of the disturbance of the surface of the nucleus, and the violent emission of jets of luminous matter in the direction of the sun, followed by the rapid turning round of these jets in the opposite direction to form the tail, and afterwards of the formation of a succession of luminous envelopes, which are evidently the result of a more general and quietly-developed emission from that portion of the whole surface of the nucleus which is turned towards the sun.

He then gave a short account of the theory first propounded

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* For an account of the discovery of this comet, and a statement of the elements of its orbit, see *Monthly Notices*, vol. xviii. p. 303.—Ed.

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by Olbers in the twenty-fifth volume of the *Monatliche Correspondenz*, and of the attempt of Brande to give a mathematical development to the theory, under certain restrictions, contained in the twenty-ninth volume of that work. It was not, however, till Bessel had had the opportunity of studying minutely the phenomena of Halley's comet, on its return in 1835, that this theory received anything like an adequate development. This comet, from the comparative simplicity of the phenomena exhibited, was better adapted than some of the other large comets for the discovery of their general principle; and Bessel, who was fortunate enough to observe the complete oscillation of one of the jets, of which he had witnessed the original emission, assumed that this could arise only from the action of some directive force or polarity, similar to that which actuated the magnetic needle, and directed to the sun as the origin or centre of force; and since the existence of one kind of polarity always implies that of the opposite kind, he was enabled to show how the sun, which originally attracts with great violence towards himself the particles streaming from the nucleus, afterwards, when they have moved through a certain space filled with matter of opposite polarity, might be as violently repelled by him, and driven out in an hyperbolic orbit, according to the usual law of central forces varying inversely as the square of the distance.

The President, in alluding to Bessel's labours, took the opportunity to impress upon the meeting the necessity of *continuous* observations of the phenomena of cometary bodies as absolutely necessary for the deduction of the law by which they are governed. Thus Bessel, on the night of October 12, 1835, watched the comet from sunset to sunrise, and was rewarded by seeing the luminous jet in that time describe an arc of 36°. In like manner Chacornac, one of the most successful observers of the phenomena of Donati's comet, watched it frequently from the time of its attaining a sufficient height above the horizon in the early morning till daylight rendered it invisible.

Before concluding, the President drew attention to the extreme importance of drawing at the time, and with all possible accuracy, the most striking of the appearances of the comet observed. This has been done by several astronomers in the case of Donati's comet, but was done very imperfectly indeed (as is complained of by Olbers) for the greater number of comets preceding that of 1811, with the remarkable exception of that of 1744, which was admirably described and graphically represented by Heinsius in a distinct account drawn up by him, and which, unfortunately, appears to be very scarce in this country.

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